99%. Ginsenoside Re, at a dose of 5, 10 or 20 mg/kg, was also dissolved in PVP-10 solution for daily IP administration.

Control treated animals were injected with an equimolar solution of PVP-10. No detectable irritation or restlessness was observed following each administration of the extract or vehicle.

EXAMPLE 5

PREPARATION OF *PANAX QUINQUEFOLIUS* BERRY EXTRACT

Panax quinquefolius (American ginseng) berry was collected in a private ginseng farm in Wausau, WI. Fresh berry was first mixed 75% EtOH. The seeds were removed, and the pulp was collected and refrigerated. The pulp was filtered and refrigerated again. Then, the EtOH was evaporated. Distilled water was added to the solution, and filtered. The solution was further mixed with 1-BuOH, the water layer was then removed, and 1-BuOH was evaporated. Finally, the solution with extracts was lyophilized.

EXAMPLE 6

PREPARATION OF A POLYSACCHARIDE FRACTION FROM *PANAX QUINQUEFOLIUS* BERRY EXTRACT

Fresh *Panax quinquefolius* (American ginseng) berry was obtained from a ginseng farm in Wausau, WI. In brief, 500 g berry was mixed with 500 ml 75% EtOH. After removal of the seeds, 356 g pulp was collected. An additional 500 ml 75% EtOH was added, and the solution was heated and refluxed. This procedure was repeated three times. EtOH was then evaporated and the solution was filtered. The filtered solution contained both polysaccharides and ginsenosides.

The remaining solution was loaded onto a Dialon HP-20 gel column (Supelco, VA), and the passed solution was collected. Afterwards, the column was washed with distilled water several times until the color of the solution disappeared. All collected solutions were mixed and filtered to obtain polysaccharides fraction (Sung *et al.*, 2000).

Finally, the extract was lyophilized. The extraction rate was approximately 2% from the fresh ginseng berry.

EXAMPLE 7

ANIMALS

Male C57BL/6J *ob/ob* mice and their lean littermates (+/?) were obtained from Jackson Laboratory (Bar Harbor, ME). In this obese, insulin-resistant mouse model, obesity is due to a mutation in the obese gene that encodes for leptin. Animals that are homozygous for the mutation exhibit morbid obesity and metabolic disorders that resembles type 2 diabetes in humans. The heterozygous mice are lean and normoglycemic. It is believed that the development of hyperglycemia in the *ob/ob* mouse is a consequence of epistatic interaction of the obesity mutation with diabetes-susceptibility genes. Adult animals at 10-18 weeks of age were used. Mice were housed in environmentally controlled conditions with a 12-h light/dark cycle and had free access to standard rodent pellet food, except when fasted before some experiments.

Another animal model, diabetic C57BL/KsJ *db/db* mice, also was utilized. C57BL/KsJ is an inbred strain distinct from the C57BL/6J strain, which serves as the recipient of the *ob* gene. In the C57BL/KsJ strain of mice, the diabetes *db* gene mutation occurred spontaneously (Shafrir, 1992). Male C57BL/KsJ *db/db* mice and their lean littermates (+/?) were obtained from the Jackson Laboratory (Bar Harbor, ME). Adult animals at 10-15 weeks of age were used. Mice were housed in environmentally controlled conditions with a 12-h light/dark cycle and had free access to standard rodent pellet food, except when fasted before experiments.

EXAMPLE 8

FASTING BLOOD GLUCOSE LEVEL

Animals were treated with *Panax ginseng* berry extract, *Panax quinquefolius* berry extract, ginsenoside Re or a polysaccharides fraction from *Panax quinquefolius* and the fasting blood glucose levels were measured. Fasting blood glucose levels were

measured after animals were fasted for 4 hr (starting from 9:00AM), on Day 0 (before treatment), Day 5 (during treatment), and Day 12 (last day of treatment). Blood glucose levels were determined in tail blood samples at 1:00PM using a Glucose Analyzer (Hemocue AB, Angelholm, Sweden).

Panax ginseng berry extract

Blood glucose levels after 4 hr fasting in C57BL/6J *ob/ob* mice and their lean littermates were measured on Day 0, and on Day 5 and Day 12 after daily administration of *Panax ginseng* berry extract or vehicle. As shown in FIG. 3A and FIG. 3B, *ob/ob* mice had significantly higher fasting blood glucose levels compared to lean controls (222 ± 16.2 vs. 176 ± 12.1 mg/dl, $P < 0.01$) on Day 0. On Day 5, blood glucose concentrations of *ob/ob* mice decreased significantly after treatment of *Panax ginseng* berry extract 150 mg/kg (156 ± 9.0, $P < 0.01$ with vehicle-treated mice 243 ± 15.8 mg/dl). On Day 12, *ob/ob* mice treated with the extract were normoglycemic (137 ± 6.7 mg/dl, $P < 0.01$ compared with vehicle treated mice 211 ± 19.6 mg/dl) and there was no significant difference in the levels between *ob/ob* mice and lean littermates (167 ± 12.8 mg/dl). The blood glucose concentrations of lean mice did not change sizably in response to treatment with the extract (182 ± 9.2 mg/dl vs. 167 ± 12.8 mg/dl of vehicle-treated mice) in either of those days.

A second diabetic animal model was used to test the effects of *Panax ginseng* berry on fasting blood glucose levels. Four-hour fasting blood glucose levels were measured on Day 0, Day 5 and Day 12 after daily IP administration of *Panax ginseng* berry extract 150 mg/kg or vehicle, in *db/db* mice and their lean littermates. As shown in FIG. 4, *db/db* mice had higher blood glucose levels compared to the lean mice (FIG. 5) in the control condition. The extract markedly lowered incremental blood glucose level in *db/db* mice on Day 5 and Day 12. After daily administration of the extract for 5 days, blood glucose concentrations of *db/db* mice decreased significantly from 268 ± 15.3 to 180.5 ± 10.2 mg/dl ($P < 0.05$ compared to the vehicle group of 226.0 ± 15.3 mg/dl). After 12-day treatment, blood glucose level further reduced to 134.3 ± 7.3 mg/dl and (P